Mountains thunder-storms were reported as follows: Ariz., 8th, 17th, 25th, 27th, and 30th; Cal., 1st, 11th, 15th, 23d, 24th, 29th, and 30th; Colo., 1st, 6th, 9th, 10th, 13th, 16th to 19th, 23d, and 26th to 30th; Idaho, 1st, 9th, 11th, 14th, 15th, 17th to 19th, 25th, and 30th; Nev., 16th, 19th, 29th, and 30th; N. Mex., 6th, 8th, 17th, 18th, and 28th to 30th; Oregon, 23d, 30th, and 31st; Utah, 2d to 9th, 20th, and 25th; Wash., 7th, 11th, 16th, 17th, 23d, and 25th; Wyo., 3d, 10th, and 25th to 27th. There were no states or territories west of the Rocky Mountains in which thunder-storms were not reported.

MISCELLANEOUS PHENOMENA.

HALOS.

In the MONTHLY WEATHER REVIEW from January to May, 1890, inclusive, the solar and lunar halos reported in the several sections of the country have been considered in connection with precipitation on the days attending and the second and third days following their occurrence, and also with relation to their occurrence in advance, or following the passage, of storms. This treatment of halos for the period named shows that 73 per cent. of the halos were attended on the first day, 70 per cent. were followed on the second day, and 62 per cent. were followed on the third day by precipitation, and indicates that about three-fourths of the halos noted in the United States were attended on the same day by precipitation at or near the station where they were observed. As regards the percentage of halos which were followed on the second and third days by precipitation in any given district, it is shown that in a large majority of instances halos were also reported for the three consecutive dates. In considering the relations of halos with storms it has been found that in districts lying east of the Rocky Mountains 57 per cent. of the halos occurred in advance, or within the eastern quadrants, of well-defined storms, and that 43 per cent. of the halos were noted in the western quadrants of areas of low pressure or within the limits of areas of high pressure. In the Rocky Mountain and plateau regions less than 50 per cent., and on the Pacific coast less than 20 per cent. of the halos occurred within the influence, or in advance, of storms. As about 75 per cent. of the halos reported were attended on the same day by precipitation at or near the place of observation, and nearly 50 per cent. of the halos occurred after the passage of, and attending, the clearing conditions which follow storms, it will be seen that halos indicate merely a moist condition of the atmosphere, and that they point to a prevalence, or to a strong probability of the occurrence on the same day, of precipitation in the districts where they are observed.

In future issues of the MONTHLY WEATHER REVIEW halos of unusual brilliancy or of a remarkable character only will be noted, and in such cases full descriptions will be given.

DROUGHT.

Drought damaging to crops and vegetation was reported near Charlotte, N. C., Double Springs, Ala., Santa Maria and Mesquite, Tex., Lead Hill, Ark., Howe, Nebr., La Monte and Oak Ridge, Mo., Havensville, Kans., and Lexington, Nebr.

MIRAGE.

At Duluth, Minn., a fine mirage was observed from 11.00 a. m. to 12.30 p. m., 16th. The Wis. shore for 20 to 30 miles stood out in bold relief; forests at an unknown distance appeared inverted; and the mouth of the Brule River, 20 miles distant, was plainly visible.

SUN SPOTS.

Haverford College Observatory, Pa. (observed by Prof. F. P. Leavenworth):

Date.	Number of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculæ.	Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	
June, 1890.										
1, 1 p. m...	0	0	0	0	0	0	0	0	1	Definition good.
2, 10 a. m...	0	0	0	0	0	0	0	0	1	Definition good.
3, 10 a. m...	2	5	0	0	0	0	2	5	2	Definition good; spots small.
4, 10 a. m...	1	1	0	0	0	0	1	1	1	Definition good; spots small.
5, 10 a. m...	0	6	0	0	0	0	1	7	1	Definition fair.
6, 10 a. m...	0	4	0	0	0	0	1	11	0	Definition poor.
7, 10 a. m...	0	4	0	0	0	0	1	15	1	Definition good; 1 large spot.
8, 10 a. m...	0	0	0	0	0	0	1	4	1	Definition bad; 1 large spot.
9, 9 a. m...	0	0	0	0	0	0	1	6	1	Definition poor; spots small.
10, 9 a. m...	1	2	0	0	0	0	2	3	1	Definition good.
11, 9 a. m...	0	1	1	1	0	0	1	3	0	Definition fair.
12, 12 m	0	0	0	0	0	0	0	3	1	Definition fair.
13, 10 a. m...	0	0	0	0	0	0	0	0	1	Definition fair.
14, 9 a. m...	1	4	0	0	0	0	1	4	3	Definition good; spots small.
18, 10 a. m...	0	0	0	0	0	0	0	0	1	Definition good.
19, 10 a. m...	0	0	0	0	0	0	0	0	0	Definition fair.
20, 10 a. m...	0	0	0	0	0	0	0	0	0	Definition good.
22, 12 m	0	0	0	0	0	0	0	0	0	Definition poor.
23, 9 a. m...	1	1	0	0	0	0	1	1	1	Definition good.
24, 5 p. m...	0	0	0	0	0	0	0	0	1	Definition good.
25, 10 a. m...	0	0	0	0	0	0	0	0	1	Definition good.
26, 10 a. m...	0	0	0	0	0	0	0	0	1	Definition fair.
27, 10 a. m...	0	0	0	0	0	0	0	0	1	Definition poor.
28, 11 a. m...	0	0	0	0	0	0	0	0	0	Definition fair.
29, 10 a. m...	0	0	0	0	0	0	0	0	2	Definition good.
30, 10 a. m...	0	0	0	0	0	0	0	0	0	Definition fair.

Mr. C. E. Buzzell, Leaf River, Ill.: June 4th and 5th, poor definition; 6th, two small groups near meridian in south latitude, unchanged on 7th, and decreasing on the 8th; 9th and 10th cloudy, clear disc on 11th. None seen on other dates.

Mr. John W. James, Riley, Ill.: observations taken on 1st to 4th, 6th, 7th, 8th, 10th to 13th, 19th, 21st to 30th, or on 22 days of the month, but the only spots seen were: 6th, one group, estimated 31,600 miles long, two days from western edge of the disc; and 7th to 8th, one spot.

Mr. M. A. Veeder, Lyons, N. Y.: 1st, a group of faculæ was about two days advanced from the eastern limb; 5th, spots were seen in the vicinity of this group, and gradually increased in size during the remainder of transit. Faculæ appeared by rotation at the eastern limb, 2d, 5th, 7th, 25th, and 26th. Faculæ were seen at the western limb, 1st and 6th.

H. D. Gowey, North Lewisburgh, Ohio: sun spots were observed on the 7th and 8th.

VERIFICATIONS.

CAUTIONARY SIGNALS FOR JUNE, 1890.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Division.]

Statement showing percentages of justifications of wind signals for the month of June, 1890:

Wind signals.—(Ordered by Assistant Professor H. A. Hazen.) Total number of signals ordered, forty-three; justified as to velocity, wholly, twenty-two, partly, one; justified as to direction, forty-three. Of the signals ordered, thirty-nine were cautionary signals, of which nineteen were wholly justified; and four were storm signals, of which three were wholly, and one partly justified. Twenty-seven signals were ordered for easterly winds, and sixteen for westerly winds, all of which were justified. Percentage of justifications, 59.8.